DOCUMENT RESUME

ED 170 639 **CG 013 430**

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TITLE A Methodology for Evaluation Research on Introductory Psychology Subject Pools.
PUB DATE 78
NOTE 25p.; Paper presented at the Annual Convention of the American Psychological Association (Toronto, Ontario, Canada, August, 1978); Best copy available

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS College Students; Course Objectives; Educational Research; *Ethics; *Evaluation Methods; *Experimental Psychology; Higher Education; *Research Problems; *Student Research; Validity

ABSTRACT

Recent research indicates that introductory psychology college students continue to be the primary source of subjects for psychological research. This extensive use of involuntary subjects in a required service subject pool raises numerous important questions for science and for educational and professional ethics. A general overview of research relevant to the attainment of the goals associated with these questions is presented. To resolve such questions, it is suggested that the principles and practices of evaluation research be applied, to produce a comprehensive assessment of the effectiveness and general impact of the extensive use of introductory psychology students. A decision-theoretical method for such an evaluation is outlined. (Author)

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ED170639

A Methodology for Evaluation Research

On Introductory Psychology Subject Pools[1]

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[2] The author would like to thank both Ronald Kulich and Carl Castore for suggestions regarding earlier drafts of this paper.

CG013430

In some areas of psychology (particularly Social and Cognitive Psychology) introductory psychology students have been the primary source of data collection. In 1977, 73.2 percent of the articles in the Journal of Personality and Social Psychology and 92.7 percent of the articles in the Journal of Experimental Psychology: Perception used introductory psychology students (Kulich, Seldon, Richardson & Servies, note 3). Such statistics seem surprising in light of the criticisms regarding the validity and generalizability of data from such a population (Orne, 1962, 1969; Rosenthal & Rosnow, 1969). Others have questioned the potentially coercive nature of introductory psychology subject pools (Cook, Kimble, Hicks, McGuire, Schoggen, & Smith, 1971). The questions of ethics and scientific value demand that subject pool usages be carefully scrutinized. Recent problems with introductory psychology subject pools in New York (i.e., being shut down due to failure to adequately scrutinize a research study) suggests that such scrutiny may come externally if not internally.

Evaluation research examines the effects of policies and programs on their targets in terms of the goals they are meant to achieve. The major assumption of evaluation research is that providing empirically derived information relevant to decision making results in better decisions than decisions resulting solely from speculation. Such an evaluation research project generally begins with the identification of goals related to the policy or program.

The goals of the introductory psychology pool

Jung (1969) surveyed 60 universities, asking for the purpose and justification for the introductory psychology pools. Sixty-four percent of the universities surveyed responded that its purpose was both educational and to serve department needs. Thirty-three percent responded that its justification was educational only, while only 2 percent responded department needs only.

Since it is unlikely that many researchers run experiments solely for the benefit of the subjects, it is evident that a central goal from the researchers viewpoint and displayed as "departmental needs" in the responses from the universities is the advancement of science through the collection of data from readily obtainable subjects.

Ninety-seven percent of the universities reviewed responded with education as a justification for introductory psychology subject pools. It is the critical difference between coercive exploitation of students and combining education with scientific inquiry. Thus it is an apparent second goal.

The American Psychological Association (1973) has published a set of ethical principles for research. Most programs engage in peer review to insure ethical research. The first two goals must be accomplished while in compliance with ethical standards.

While other goals could certainly be suggested, such as

education of graduate students, generating publications, and protection of the existence of the subject pool, which may or may not be subsumed under compliance with ethical standards, it is suggested that these are the primary goals of the introductory psychology subject pool programs, with other goals subsumed within these goals.

Evaluation of the attainment of these goals entails the assessment of information already reported and the development and application of measures to further assess the value of such programs in regards to each goal.

Advancement of science

One need only look at a few issues of the Journal of Personality and Social Psychology to see that introductory psychology pools play a large role (72.3 percent) in the publication of articles (Kulich, et al., 1978). However, whether the importance of the subject pool is proportional to its representation in journal articles is subject to serious question.

Evidence indicates that subjects from introductory psychology pools differ from the general population on numerous dimensions (Bell, 1962 ; Smart, 1966). It has even been suggested that introductory psychology students are not even representative of college students of the same year in college (Rosenthal & Rosnow, 1969). Even within the subject pool itself, biases related to the subject participating in the study early or late in the semester (Seldon, Kulich &

Healy. 1978), experience in experiments (Silverman, Shulman, & Wiesenthal, 1975; Holmes, 1967) and slightly increased levels of sophistication of the subjects (Page, 1968, 1969) have been found. It is thus not surprising that Rosenthal and Rosnow (1969) have suggested that McNemars proposal (1946) that, "the existing science of human behavior is largely the science of the behavior of sophomores" sounds unduly optimistic.

While the external validity of experimentation with introductory psychology subject pools is open to question, the same is true of many alternate samples. Volunteers have been demonstrated to be different on dimensions such as birth order (Capra and Dittes, 1962), level of approval seeking (McDavid, 1965) and various other dimensions (Bell, 1962; Lasogna and Von Felsinger, 1954; Riggs and Kaess, 1955). When paid volunteers are used, subjects are found to have a higher need for cash (Howe, 1960), which can be expected to be confounded with social class.

Without coercion as a method of recruitment, external validity may be a question in all future experimentation. As a control variable, the method of recruitment becomes a problem when it is not controlled at various levels, i.e., the failure to replicate research with other recruitment methods. The extent to which subject pools provide easily accessable samples thus diminishing such replication may limit its value to the advancement of science.

The internal validity of experimentation with introductory psychology students has also been questioned. Page has found the level of sophistication of subjects to confound classical conditioning of attitudes (Page, 1969) and figure-ground perception experiments (Page, 1968). The increased sophistication of psychology students through course participation may increase effects due to demand characteristics. Weber and Cook (1972) have outlined four demand characteristic related roles for subjects. The good and the negativistic subjects try to confirm or disconfirm the experimenters hypothesis. The increased sophistication of subjects may be related to guessing the hypothesis and attitudes toward required service in experiments may determine the motivation to confirm or disconfirm the hypothesis. A third role suggested by Weber and Cook, the evaluative subject, may appear more frequently if the subject relates participation to course evaluation.

Other means of subject recruitment may make other threats to internal validity more salient. Volunteers, which have been shown to be more approval seeking (McDavid, 1965), may be more susceptable to being the evaluative subject. Unfortunately, the easy accessability of introductory psychology pools reduces the frequency of replications in samples whose susceptibility to demand characteristics differ.

It could be suggested that the accessability of subjects may be both the chief strength and weakness of

introductory psychology pools. It undoubtedly increases the quantity of ill-considered research because it requires little recruitment effort.

A total assessment of the impact of the introductory psychology pool on psychology seems somewhat less than feasible. However, the ongoing assessment of factors within the pool associated with the advancement of science can be expected to improve decision making where it affects the pool's value to the science.

Experimental requirements as a pedagogic endeavor

Of fifty-two universities surveyed (Jung, 1969), 97 percent responded that educational value was a justification for requiring the participation of psychology students in experiments. Yet 38 percent of these universities required no feedback of the methods and purpose of the experiment. Many more did not require the feedback to be immediate, thus requiring the subject tc return if he desires such feedback. While it is clear that universities wish to portray experimental participation as an educational endeavor, it is probably not a key consideration in maintaining that pool.

Principle six of the American Psychological Associations's ethical guidelines (Ad hoc Committee on Ethical Standards in Psychological Research, 1973) pertains to the educational value of experiments.

> "Ethically acceptable research begins with the establishment of a clear and fair agreement between the investigattor and the research participant that clarifies the

> responsibilities of each. The investigator has the obligation to honor all promises and committments included in that agreement."

Inclusion of the research participation requirement in course descriptions, its requirement as a course component, and most likely the manner in which it is presented explicitly or implicitly suggests that the subject's assistance will be repaid with a contribution to the student's psychological knowledge. Failure to do this is clearly inconsistent with the principle of a fair agreement as stated in principle six and unless some other form of equitable payment is given, probably represents an abuse of power as educators and controllers of grades for personal benefit or the benefit of one's colleagues.

If a professor gave two extra credit points for every three dollars a student gives him or gives an incomplete to any students who fail to give him a set amount of money and then used that money to hire subjects, there is little doubt that most would consider this act unethical. It is unlikely that many programs allow students to hire others to do their experiments for them. The student is required to participate in the experiments because when credit for the course is awarded, a set of knowledge is expected to have been collected by the student. Yet many programs make feedback optional for the experimenter, subject or both. Testing generally insures that learning is taking place and provides motivation to the student, yet measurement of this

learning is rarely encountered. Researchers have been heard suggesting the students would rather leave than hear the feedback. Yet where else do we give course credit without requiring the subject to attend to the content of a component of a course?

A possible assumption regarding research participation is that mere exposure results in some form of learning. What kind of learning, how much learning and whether that learning is relevant to the purposes of the introductory psychology course has never been evaluated. This mere exposure hypothesis has certainly not been accepted by many academicians since testing continues to be prevelant in most courses. Evaluation of mere exposure learning and possible alternatives is critical to the educational justification of introductory psychology pools.

The American Psychological Association's Ad Hoc Committee Ethical Standards in Psychological Research (1973) recommends continuing evaluation of student attitudes toward experiment participation in a set of recommendations for conducting subject pools. If education as a justification for pools is to continue, evaluation of experimental participation for educational value and comparisions of methods of administration are needed. Yet journal discussion of evaluation reveals only one limited evaluation of a new system (Davis and Fernald, 1975). Davis and Fernald note that the number of required experiments is frequently tied to research needs rather than the needs of

the students. Since such a practice suggests inconsistency with ethical principles and public justifications, they recommend demonstrations to augment experiments and the maintaining of a constant research requirement.

The dearth of information as to the effectiveness of methods of conducting subject pools makes it impossible to draw conclusions about the value of experimental participation for the subject. Early investigations (Miller, Kulich and Hanson, note 2; Seldon, Kulich,Richardson and Servies, note 3) suggest that subjective evaluations of students regarding the worth of the experimental participation is varied but slightly negative. The objectives of experimental participation require clarification before adequate evaluation measures can be developed. Consistent methods and measures could allow comparisions and suggest systems of greater value to the student.

Compliance with ethical standards

Jung (1969) found that over 90 percent of all subjects used were college students. 45.3 percent participated because it was required, 25.4 percent as an option and 22.1 percent for extra credit. The initial draft of ethical principles (Cook, Kimble, Hicks, McGuire, Schoggen, and Smith, 1971) states:

> "Students should not be required to participate in research as a condition for entering a course or for obtaining grade points or avoiding loss of them, or as an alternative to another onerous task, where that participation requirement is to any extent in the service of research."

Although this principle was not accepted in the final draft, subject pools connected with the enrollment in courses are given special consideration in the American Psychological Association's ethical guidelines (American Psychological Association: Ad hoc Committee on Ethical Standards in Psychological Research, 1973) due to its potentially coercive nature and potentially questionable justification in terms of value to the subjects. Eight recommendations are proposed.

The first recommendation suggests that the experimental participation requirement be included in official course listings. Unfortunately, the value of such inclusion is lost when the course is required. Further, if not required, it denies educational opportunity for those who are interested in the course. Thus such a practice is of little value.

The second recommendation is for review by committees to protect subjects. The committee generally engages in armchair speculation regarding potential risk, a practice which the rigorous scientist generally frowns upon. Gergen (1973) has suggested that "factual advice" is much more beneficial than codified ethics. Subjects have been asked to subjectively rate different tasks for aversiveness (Farr and Seaver, 1975), ethics (Sullivan and Deiker, 1973; Wilson and Donnerstein, 1976), and legality (Wilson and

Donnerstein, 1976) and legal advisors have given opinions on the legality of some manipulations (Silverman, 1975). The ability of debriefing to diffuse negative feelings remains unclear and complex (Ring, Walston and Corey, 1970; Walster, Berscheid, Abraham and Aronson, 1967). Methods using role-playing to anticipate informed consent in deception studies which could potentially be aversive have been suggested (Berscheid, Baron, Dermer and Libman, 1973). Role-playing seems promising as a first step in the assessment of risk in a research design. However, the predictive ability of such vicarious evaluation has yet to be well substantiated. The speculation of subjects on their reaction to a manipulation in an experimental situation may be more predictive of the review committee's speculations than actual reactions.

Post-experimental assessment as done by Abramson (1977) in regards to research on sexuality necessitates exposure of the subjects prior to assessment. Developing and testing models for the prediction of subject's reactions and evaluation of reactions after the experiment would allow assessment of various procedures and the effectiveness of subject usage committees.

Recommendations three and four of the Ad hoc Committee on Ethical Standards in Psychological Research deals with informed consent, as did item one. Item three recommends alternate projects for those who prefer not to participate. Alternate projects can unfortunately be made quite onerous, thus negating their value. This author has had only one

student in eight hundred choose an alternate project (an alternate project which was imposed and not by the authors choice), suggesting that it may not be a viable alternative.

Item three also suggests that subjects choose the type of experiment in which they participate. Subject's time limitations, lack of insurance that numerous experiments are available and minimal descriptions of the experiment can serve to make such a choice impossible.

Item four suggests that subjects be reminded of their right to leave at any time and mentions the signing of an informed consent after an explanation of the procedures. A recently performed experiment used such procedures. Subjects were informed upon arrival that they would sing before a panel of music experts and were asked to sign an informed consent. The same individuals for whom singing in front of an audience is traumatic (high social anxiety) would be the individuals who might be fearful of refusing to participate. Handled well by the experimenter, this dilemma could be abated to a large degree. Unfortunately, whether the obtainment of informed consent and the post-experiment debriefing are effective is difficult to evaluate prior to the actual running of subjects. Continuous post-experimental feedback might be the best assessment procedure. A clearer image of whether and how demand characteristics prevent subjects from dropping out of the experiment demands further investigation.

Item five deals with treating subjects with respect and courtesy, i. e., remembering that this white rat is human. Item six discusses rewards for research such as education. This item is quite central to the goals of the subject pool and has already been dealt with in greater detail.

Items seven and eight deal with evaluation. The seventh recommendation suggests a mechanism for student complaints. One could suggest that such a feedback system is much too limited and places the onus of evaluation on the subject whose only motivations may be altruism to protect others or, more likely, revenge. This inducement may by insufficient for many dissatisfied subjects.

Item eight calls for continuous evaluation and improvement of recruiting procedures. It might be advisable that such evaluation be extended to include educational value and the effectiveness of screening procedures. However the criticism of the lack of evaluation is certainly easier than the development and analysis of measures necessary for such evaluation.

Why a decision-theoretic approach?

Given that the goals of the introductory psychology subject pools can be identified, and the attainment of these goals can be assessed, how can the information be organized such that it will improve decision making? The two alternatives which are available are multivariate hypotheses testing and the decision-theoretic approach as presented by

Edwards et al.(1975).

Hypothesis testing tells us whether it is likely that a difference occurs by chance. Essentially, since two alternatives cannot be identical, it tells us it is likely that we have successfully measured a difference in two alternatives. It does little to aid in the organization of information and tells us little about the level of impact of an alternative. Its philosophy suggests that we learn nothing from a probability of .15 and allows the luxury of confidence if the probability falls below .05. The experimentalists approach is best suited to an unchanging program in which subjects, committees, reviewers, experimenters and other factors remain constant. It is unlikely that any department can adjust its subject pool policies to provide a suitable atmosphere for traditional experimental methodology.

Edwards, Guttentag, and Snapper (1975) discuss the "baseball statisticians approach". The experimentalist wishes to test a hypothesis giving one a simple dichotomous result. The baseball statistician wants to describe a phenomena as thoroughly as possible and present that information in a fashion that is usable for the manager. Further, such evaluation is formative rather than summative in nature, i.e., it allows continuous evaluation and feedback for the utilization of decision makers, rather than the evaluation of an end product. It is able to cope with the continuous change which generally occurs in most

programs. Thus, such an approach seems best suited to our needs.

Applying the decision-theoretic approach

The major goals of the introductory psychology subject pools have already been disucssed. Each of these three goals can best be linked to different but non-exclusive subgroups. It is expected that researchers are most concerned with the advancement of science, introductory psychology instructors are most concerned with educational value and the subject usage committees are concerned with ethical considerations.

From each subgroup, subgoals which exist within each goal can be assessed. Under the advancement of science may be subgoals such as training of graduate students, generation of publications, obtaining pilot data and obtaining significant findings. Under educational value one might find the ability to identify independent and dependent variables, understanding of experimental rationales or a clearer and more realistic perception of the meaning of laboratory experimentation. Subgoals regarding the ethical principles may include the feeling of freedom to decline participation, minimal stress associated with experimentation and the lacking of undesirable after effects of experimental participation. Measures for each of the subgoals must then be devised.

Step two involves the assessment of the relative

importance of each goal. Since the evaluation of all goals relative to each other would be extremely cumbersome, the relative importance of subgoals within each primary goal will be assessed followed by the assessment of relative importance of each subgoal. The group most strongly linked to each goal (researchers, educators and subject usage committees) will assess relative importance as outlined by Edwards et. al. (1975). The least important goal is assigned a value of ten, with other goals evaluated relative to the least important goal. The same process, sampling from a combination of the above subgroups, gives the relative importance of each major goal.

Step three requires the establishing of criteria for goal attainment. Measures which are dichotomous are most suitable since they require no criteria judgement. Either the response is desirable or undesirable. Non-dichotomous measures require a conversion to a dichotomy for utilization as probabilities of goal attainment.

Prior probabilities for goal attainment must then be estimated. These prior probabilities are generally based on the subjective probabilities of those most closely related to the goal being assesed. To the extent that these subjective probabilities are formulated from previously obtained data, these prior probabilities could reflect data. For many or most, they are speculative. Where different subject pool policies or methods are being compared, these prior probabilies would reflect expected differences and

provide a means of viewing all considerations when proposing alternatives.

Prior utilities can be calculated based on prior probabilities, yielding a projected utility for alternatives. The utility of each goal can be found from:

$$U_j = \sum_{i=1}^{n} P_i w_i \qquad (1)$$

where U_j = the utility of each goal, P_i represents the prior probability of subgoal attainment, w_i = the weighting for that subgoal, and n = the number of subgoals within the goal. The prior utility can then be found as follows:

$$U = \sum_{j=1}^{3} U_j W_j \qquad (2)$$

where U = the utility of the system and w_j = the weighting of the three goals.

It is this point at which one collects data, and converts it to percentages of goal attainment. From these percentages for attainment of goals, posterior probabilities of goal attainment can be obtained using an algorithm outlined by Edwards, Lindmen, and Savage (1963) using the beta distribution as a prior and, since at this point in the evaluation of subject pools these prior probabilities are weakly held, assuming that the parameters of the prior beta distribution sum to 1.0. An example of the utilization of this procedure can be found in Edwards, Guttentag and

Snapper (1975).

From the posterior probabilites, a posterior utility is calculated in the same way as the prior utility (using eq. 1 and 2) substituting posterior probabilities for prior probabilities. This utility provides an ongoing easily utilizable figure for comparison to alternate models and continuous scrutinization.

Discussion

While the simplicity of a system utility has merit as an overall picture of the functioning of the pool, it is likely that data from goals and subgoals will be most effective at directing future efforts and changes in the system. A continuous effort to maximize utility through maximizing goal attainment will serve both as a diagnostic tool and as performance evaluation.

There are three major problems of the present proposal, all of which are not uncommon to evaluation research. Because one cannot readily manipulate changes in subject pools, numerous potential confounds and sources of variation exist. Characteristics of students, attitudes and values of experimenters, and quality and diligence of subject usage committee evaluations can vary from one year to the next independent of changes in the system. The experimenters and subject usage committeess could become increasingly aware of evaluation. However, if such evaluation results in improvement simply due to being evaluated, that in itself is

some measure of success.

A second problem lies in measurement. The difficulty of assessing items such as the advancement of science is likely to introduce a large level of error. With more evaluation and increased sophistication, such evaluations would become increasingly valuable and better research designs possible.

However, a third problem frequently encountered by evaluation researchers is that those whose program is evaluated tend to devalue evaluations whose results are inconsistent with their personal beliefs. Good evaluation research will tell them that their opinion was correct while bad or invalid evaluation research will tell them they are wrong.

While early findings in evaluating introductory psychology pools can be expected to have weaknesses both in sophistication and level of acceptance, such an endeavor would seem to be long overdue. Our subject pools are an integral part of our science, as evidenced by their representation in the journals. It is time we went beyond the level of spot criticisms and proceed with detailed examination of the process. Only then can we confidently incorporate these findings in future decisions.

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